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Ekapa, a new genus of mygalomorph spiders (Araneae, Entypesidae) from South Africa

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Abstract

A new genus of mygalomorph spider *Ekapa* **gen. nov.**, is described from South Africa. The new genus was formed to include the species *Hermacha curvipes* Purcell, 1902 and *Hermacha nigra* Tucker, 1917. These species are synonymized based on their somatic similarities, such as fovea shape, cheliceral teeth distribution, ocular pattern, presence of preening combs, and their close geographic distribution. The new genus proposed is distinguished by the presence of a projection in the retroventral side of the palpal tibia in males, together with a distinctive copulatory bulb shape; and in females by the shape of their spermathecae, with a high base and apical stalks that open into oval apical receptacles.

Keywords

new genus, new species, new synonymy, systematics, taxonomy

Introduction

The fauna of mygalomorph spiders from South Africa is poorly known and many of the current genera require revision (Dippenaar-Schoeman 2002; Ríos-Tamayo and Lyle 2020). Recently, taxonomic work on South African mygalomorph spiders has

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been focused on the newly described family Entypesidae Bond, Opatova & Hedin, 2020 (Opatova et al. 2020). Several regional revisions focused on the genera *Lepthercus* Purcell, 1902, *Entypesa* Simon, 1902 and *Hermacha* Simon, 1889. The genera *Hermachola* Hewitt, 1915 and *Brachytheliscus* Pocock, 1902 were revalidated. Lastly, a new genus *Afropesa* Zonstein & Ríos-Tamayo, 2021 (Ríos-Tamayo and Lyle 2020; Ríos-Tamayo et al. 2021; Zonstein and Ríos-Tamayo 2021) was described. Work relating to the genus *Hermacha*, evaluated the status of different species, re-describing many of them and describing three new species. Additionally, *Hermacha curvipes* Purcell, 1902 and *Hermacha nigra* Tucker, 1917 were categorized as species *incertae sedis* (Ríos-Tamayo et al. 2021).

In the present paper, we propose to synonymize the species *H. curvipes* and *H. nigra*, based on their morphological similarities observed through the examination of the type specimens and additional related material. Besides the similarities of the two species, the somatic characters and the morphology of the copulatory organs do not match the features of the genus *Hermacha*, and have not been observed in any other related genus. Thus, we propose the creation of a new genus, described here to accommodate these species.

Materials and methods

The material studied here is deposited in the following institutions (curators are noted in brackets): **NM** – Natal Museum Pietermaritzburg, KwaZulu-Natal, South Africa (Kirstin Williams); **SAM** – Iziko South African Museum, Cape Town, South Africa (Aisha Mayekiso) and **NCA** – National Collection of Arachnida, ARC – Plant Health Protection, Pretoria, South Africa (Petro Marais).

All measurements are given in millimeters and were taken from the left side of the specimen. Total length was measured without spinnerets. The photographs were taken using a high-resolution microscopy camera AxioCam MRc5 mounted on a Zeiss Axio Zoom V16 microscope. Extended focal range images were stacked using the ZEN module Z-stack software. Lengths of leg segments are always given in the same order: femur, patella, tibia, metatarsus, tarsus, and total. The male copulatory bulb and female genitalia were dissected using a microscalpel. The copulatory bulbs were photographed following the approaches of Goloboff (1995) and Ríos-Tamayo and Goloboff (2018). Spermathecae were clarified by immersion in clove oil, thus making the opaque glandular tissues that cover the structure transparent.

Abbreviation and notation for leg spines follow Goloboff and Platnick (1987) and Ríos-Tamayo and Goloboff (2018); describing the legs from I to IV and from proximal to distal (i.e., from femur to tarsus within each leg, from basal to apical within each segment); the sequence prolateral-dorsal-retrolateral-ventral (P-D-R-V) is always followed, using lowercase letters (p-d-r-v), when referring to spiniform setae instead of spines. The filiform trichobothria present in the metatarsi follow a pattern of alternating long and short trichobothria; the numbers of shorter trichobothria are

given in parentheses, describing from proximal to distal (e.g. the notation (3)1(2)1 refers to three short trichobothria, followed by a long trichobothria, followed by 2 short ones, and a long one).

Abbreviations used in species descriptions are as follows: **ALE**, anterior lateral eyes; **AME**, anterior median eyes; **D**, dorsal; **DB**, dorsal basal; **P**, prolateral; **PA**, prolateral apical; **PLE**, posterior lateral eyes; **PLS**, posterior lateral spinnerets; **PME**, posterior median eyes; **PMS**, posterior median spinnerets; **OQ**, ocular quadrangle; **R**, retrolateral; **RM** retrolateral medial; **RA**, retrolateral apical; **V**, ventral; **VB**, ventral basal; **VPOST**, ventral posterior. In the notation of leg spines, an expression such as D–R, D–P indicates that the spines occupy the dorsal–posterior superior surfaces, or the dorsal–prolateral superior surfaces; 1:2 A, 3:4 B indicates that the spines or scopula referred to are on the apical half or basal three-fourths. In the description of the preening combs, II 2 or 3 PV indicates that the combs are on the second leg, composed by two or three setae and in prolateral-ventral position.

Taxonomy

Family Entypesidae Bond, Opatova & Hedin, 2020

Genus *Ekapa* gen. nov.

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Type species. *Hermacha curvipes* Purcell, 1902, by present designation.

Etymology. The new name "*Ekapa*" is taken from the type locality and means "Cape Town" in the Xhosa language. The gender is neutral.

Diagnosis. The new genus can be distinguished from all other related genera in the family Entypesidae by the presence of a retroventral projection in the male palpal tibia (absent in all other entypesid genera; Figs 2D, 4E). Males of *Ekapa* gen. nov. can also be distinguished from *Hermachola* and *Brachytheliscus* by the presence of retrolateral apical megaspines on tibia I (Figs 1F, 4H), similar to *Afropesa* and *Hermacha*. They can be differentiated from *Afropesa* by the male palpal bulb morphology which is piriform, with dorsal keels and strong flanges (Figs 2A–C, 4A–D) and from *Hermacha* by the presence of preening combs in both sexes. *Ekapa* gen. nov., differs from *Lepthercus* by the lack of a megaspine on a raised cuticular spur on tibia I of males. Females possess spermathecae with a high basal portion (fused or not) and stalks that open in oval apical receptacles (Fig. 5D, E).

Relationships. Given the morphological characters presented here, this new genus shows affinities with *Afropesa*, *Hermacha* and the Australian genus *Stanwellia* Rainbow & Pulleine, 1918 (currently belonging to the family Pycnothelidae), since they all present a retrolateral apical megaspine on tibia I. Nevertheless, *Ekapa* gen. nov. differs from them due to its characteristic retroventral projection on the male palpal tibia. *Stanwellia* spp, demonstrate a similar shape of the spermathecae (with a high base), but

differ from *Ekapa* gen. nov. since they possess flexuous leg tarsi, and a straight thoracic fovea (Harvey et al. 2018).

Description. Cephalothorax and legs covered with short bristles; cephalothorax with dark setae on the margin, more abundant towards the posterior part. Thoracic fovea short, straight or slightly recurved. Eyes group broader than long, anterior row slightly procurved and posterior row recurved (Figs 1C, 3F, 5C); clypeus short. Abdomen covered with short black hairs, with a pattern of yellow chevrons (Fig. 3C). Sternum oval, covered with black hairs, with posterior sigilla well defined and separated from the sternal margin. Labium broad, with few cuspules (principally in females), labiosternal sigilla consisting of a pair of well-marked sigilla. Maxillae with strong cuspules on the posterior inner edge. Stout short bristles as a rastellum, chelicerae with bristles on dorsal and retrolateral face. Chelicerae with a continuous line of equidistant teeth on the promargin, with many small basal denticles (no equidistant line with a few basal denticles in *Hermacha*). Male intercheliceral tumescence well-marked and setose (Fig. 3E). Serrula absent in both sexes. Leg formula 4123; all legs sparsely covered with hairs. Legs with all tarsi aspinose. Tibia I of male with a megaspine, and with a series of spines, all of which are almost the same size (Figs 1F, 4H). Palpal tibia slightly swollen, with prolateral spines, ventrally with some rigid setae and a projection on the retroventral side (Figs 2D, 4E). Cymbium short without spines. Copulatory bulb piriform, flanged, with long dorsal keels and with a short slightly curved embolus (Figs 2A–C, 4A–D). Scopulae: on metatarsi I–II distributed in the entire segment; III sparse, apical; IV absent. Present on tarsi I–II, throughout each segment (dense in females), III–IV sparse. Trichobothria: filiform in two rows from basal to anterior; metatarsi with one straight line, tarsi with a narrow zigzag row along length. Metatarsal preening combs present in legs II–IV. Spermathecae: receptacles with a high base (fused or not), and with stalk that ends in the oval apical receptacle (Fig. 5D, E).

Species included. *Ekapa curvipes* (Purcell, 1902), comb. nov.

***Ekapa curvipes* (Purcell, 1902), comb. nov.**
Figs 1–5

Hermacha curvipes Purcell, 1902: 377; Tucker 1917: 106.
Hermacha nigra Tucker, 1917: 110; Hewitt 1919: 109. new synonymy.

Type material. ***Syntypes***, 2 ♂♂: *Hermacha curvipes* (SAM-ENW-X006011, Fig. 1A–I): Western Cape, Simonstown (Waterfall) (34.18333°S, 18.43333°E), Jul 1899, Purcell, W. coll. Syntypes, 2 ♀♀: *Hermacha nigra* (SAM-ENW-X013899, Fig. 3A–F), Bergvliet Flats, Cape Peninsula (34.05°S, 18.45°E), Sept 1904, Purcell, W. coll.

Additional material examined. Western Cape, Cape Town, Aug 1965, collector not indicated, 1 ♂ (NM 16639); Bergvliet flats, Constantia, (34.05°S, 18.45°E), Oct 1902, collector not indicated, 1 ♀ (SAM-ENW-X012166), erroneously identified as *Hermacha purcelli*; Table Mountain, 1 Aug 2005, J. Pryke, C. coll., 3 ♂♂ (NCA 2008/770).

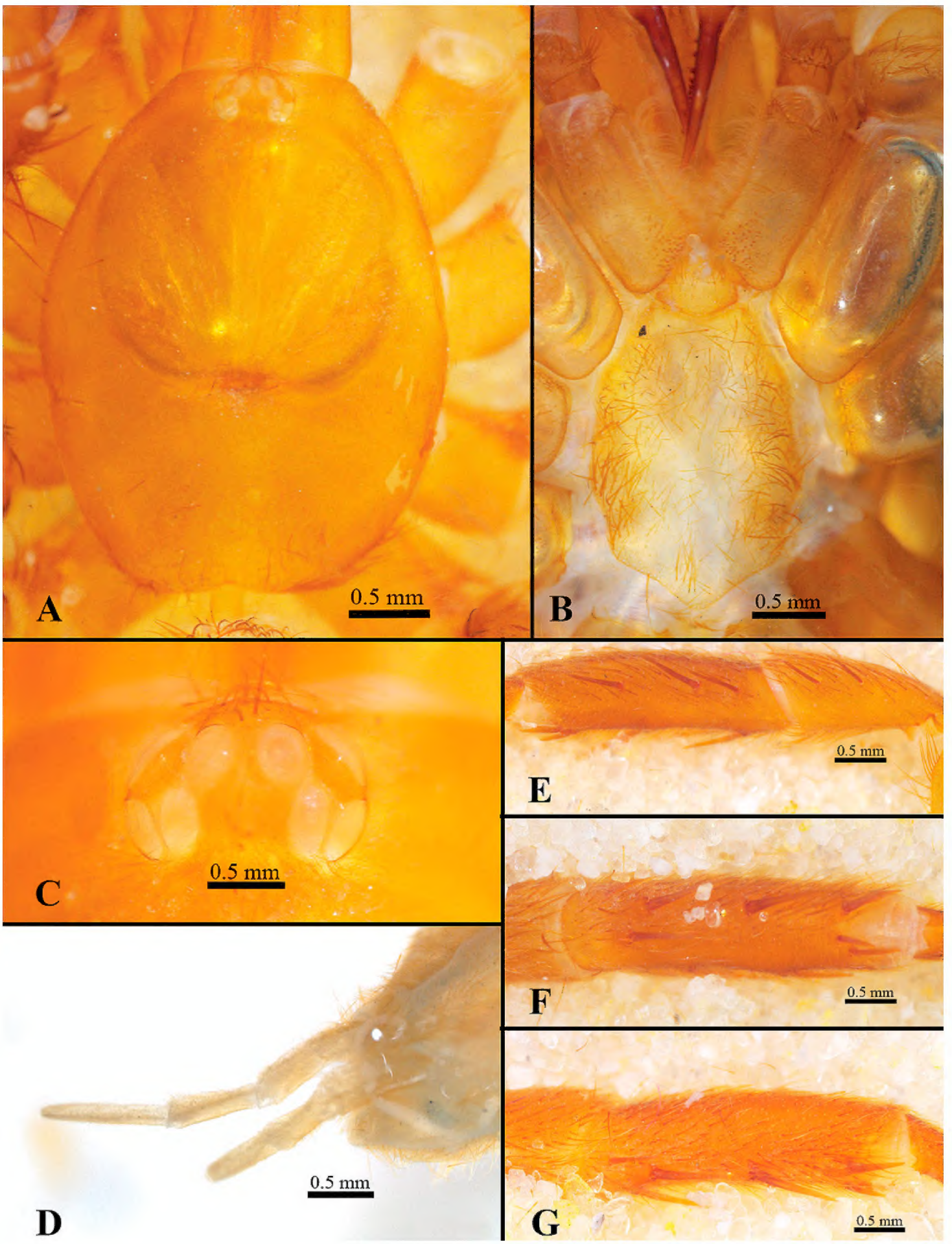

Figure 1. *Ekapa curvipes* (Purcell, 1902) comb. nov., male holotype (SAM-ENW-X006011) **A** cephalothorax, dorsal view **B** sternum, labium, maxillae, ventral view **C** ocular pattern, dorsal view **D** spinnerets, ventral view **E–G** tibia I **E** prolateral view **F** ventral view **G** retrolateral view.

Synonymy. Purcell (1902), described *Hermacha curvipes* from Simonstown (Cape Town), based on two male specimens. Fifteen years later, Tucker (1917) described several female specimens from the same locality, as the unknown females of

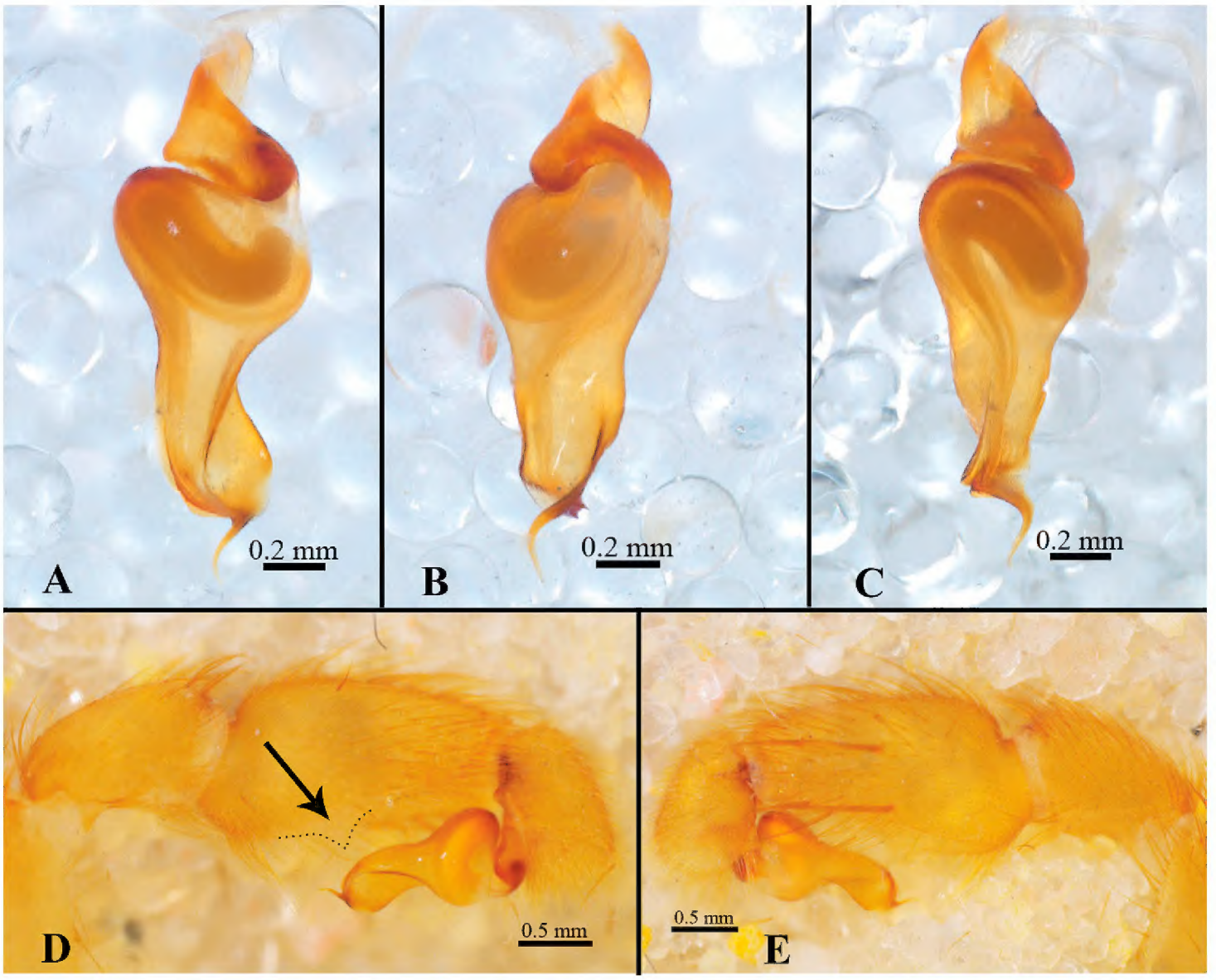

Figure 2. *Ekapa curvipes* (Purcell, 1902) comb. nov., male holotype (SAM-ENW-X006011) **A–C** copulatory bulb **A** retrolateral view **B** ventral view **C** prolateral view **D, E** distal segments of right pedipalp **D** retrolateral view, arrow indicates the projection in the retroventral side **E** prolateral view.

H. curvipes. Tucker (1917) gave no catalog number for these specimens, and it is therefore impossible to identify which specimens the author used in his description. In the same article, Tucker (1917: 110) described the species *H. nigra* Tucker, 1917, based on two females, from Bergvleit Flats, Cape Town which is 16 km from the type locality of *H. curvipes*. These two species have characters both similar and different to those found in the genus *Hermacha* (see Ríos-Tamayo et al. 2021) such as: fovea shape, cheliceral teeth distribution, ocular pattern, presence of preening combs and a relatively close geographical distance. The examination of additional male and female specimens (belonging to a new undescribed species) collected from Knysna Forest, with the same combination of characters, support our conclusion that the female of *Hermacha nigra* and the male of *Hermacha curvipes* are conspecific; with *H. nigra* as junior synonym.

Remarks. The holotype specimen (male, SAM-ENW-X006011) is not in the best condition; possesses a pallid coloration (seems to be discolored), with legs very soft (Figs 1A–G, 2A–E). To preserve the holotype specimen and prevent any damage resulting from manipulation of the specimen, descriptions were made based on the male

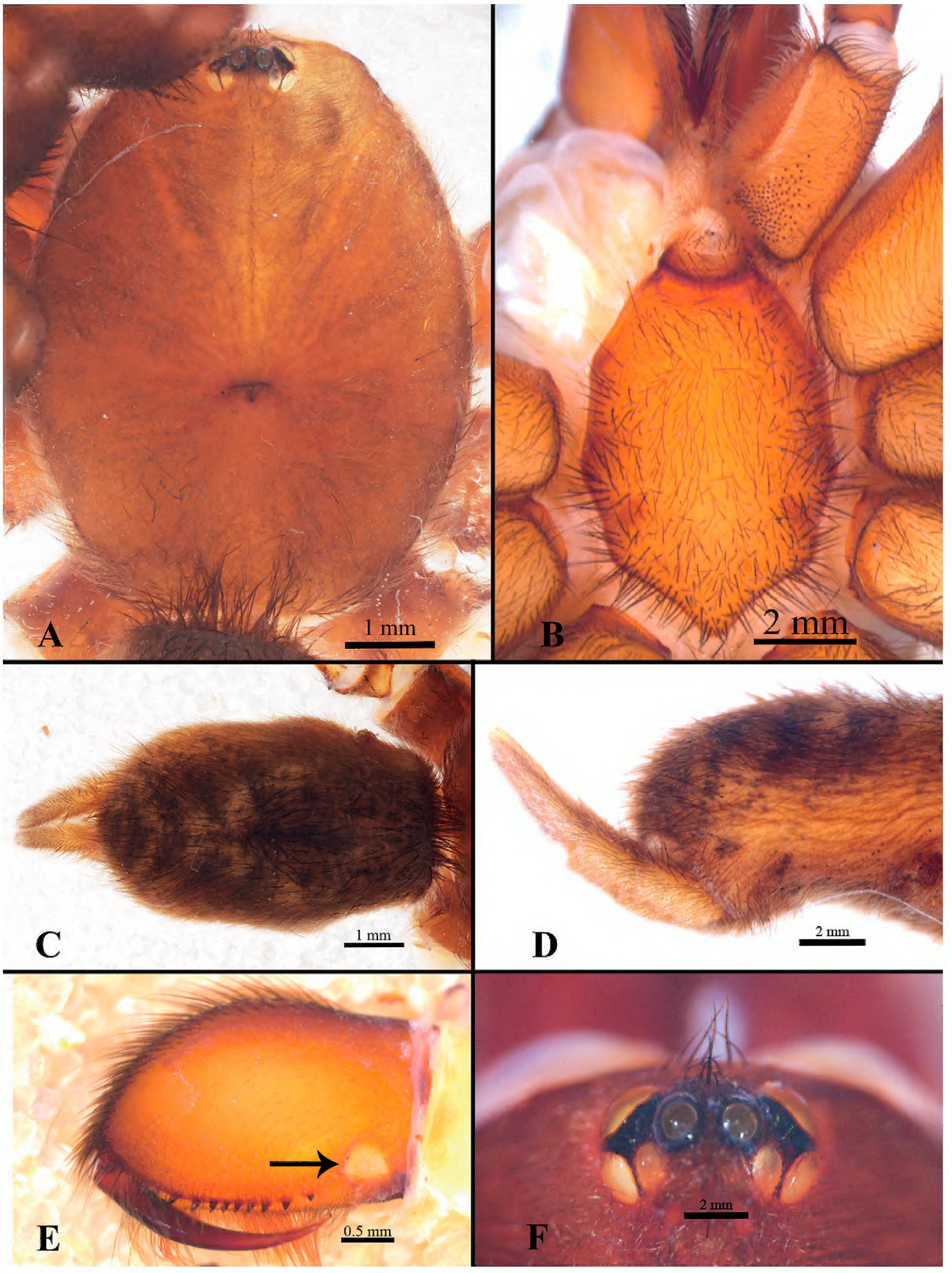

Figure 3. *Ekapa curvipes*, male (NCA 2008/770) **A** cephalothorax, dorsal view **B** sternum, labium, maxillae, ventral view **C** abdomen, dorsal view **D** spinnerets, lateral view **E** chelicerae, prolateral view, arrow indicate the intercheliceral tumescence **F** ocular pattern, dorsal view.

specimen NCA 2008/770 from Table Mountain (about 25 km N from the type locality), 1 Aug 2005, J. Pryke, C. coll., 3 ♂♂, which shares all the characteristics observed in the holotype (Figs 3–F, 4A–I).

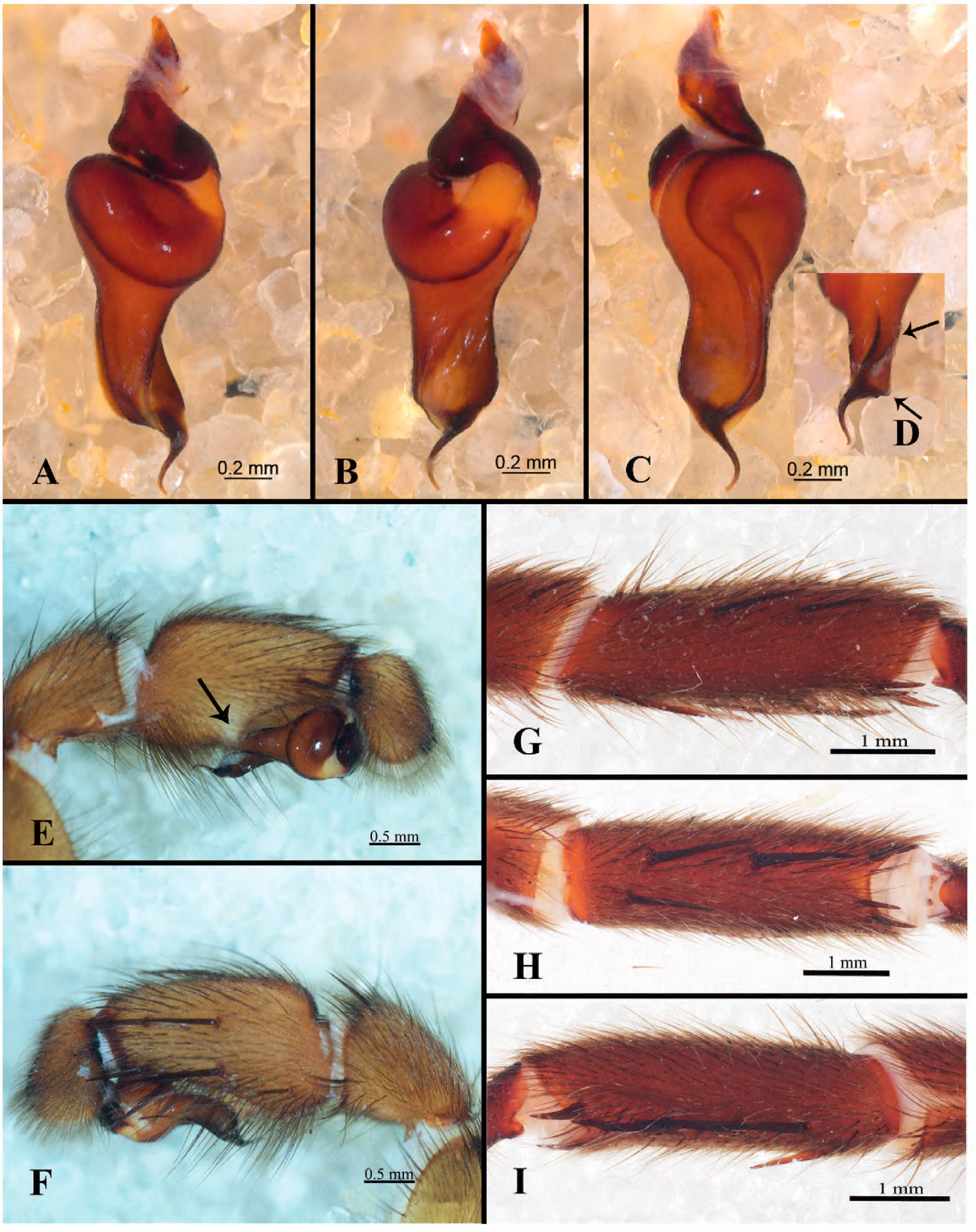

Figure 4. *Ekapa curvipes*, male (NCA 2008/770) **A–D** copulatory bulb **A** retrolateral view **B** ventral view **C** prolateral view **D** closeup of the tip, arrows indicate the two keels **E, F** distal segments of right pedipalp **E** retrolateral view, arrow indicates the projection in the retroventral side **F** prolateral view **G–I** tibia I **G** prolateral view **H** ventral view **I** retrolateral view.

Diagnosis. As for the genus.

Description. Male (NCA 2008/770, Figs 3A–F, 4A–I): ***Total length*:** 14.74. ***Cephalothorax*** (Fig. 3A): length 7.09, width 5.36, with lateral dark marginal bris-

tles, and dorsal pubescence. ***Cephalic region*:** length 4.27; clypeus short, with 6 bristles on the edge, seven bristles in front (the central bigger) and 4 on the back of the OQ. ***Fovea*:** width 0.69, recurved and divided. ***Eyes, diameters and interdistances*** (Fig. 3F): AME 1.08, ALE 2.09, PME 1.60, PLE 1.90, OQ length 3.83, 7.03 width; AME-ALE 0.57, PME-PLE 0.17, AME-PME 0.48, ALE-PLE 0.37, AME-AME 0.84, OMP-OMP 2.73. ***Chelicerae*:** length 3.38, width 1.94, with dark dorsal-anterior bristles, rastellum formed by setae; intercheliceral tumescence small, well-marked and with setae (Fig. 3E). Cheliceral furrow with 10 promarginal teeth and 20 mesobasal denticles. ***Labium*:** length 0.82, width 1.84. ***Maxillae*:** length 4.19, width 1.75, with 124 cuspules on inner corner, prolateral face curved, soft area small, with long uniformly distributed hairs. ***Sternum*** (Fig. 3B): length 6.96, maximum width 4.98. ***Abdomen*** (Fig. 3C): length 6.07, covered with small hairs and dark bristles. ***Spinnerets*** (Fig. 3D): PMS: length 2.28; PLS: length of basal:medial:apical segments 3.03:2.35:4.18. ***Lengths of legs and palp*:** I: 6.90, 4.09, 4.87, 4.97, 3.18, 24.01. II: 5.13, 2.96, 3.62, 3.74, 2.41, 17.86. III: 4.58, 2.53, 2.97, 4.08, 2.33, 16.49. IV: 5.73, 2.88, 4.13, 5.44, 2.59, 20.77; Palp: 7.39, 3.98, 5.04, —, 2.72, 19.13.

***Chaetotaxy*:** Leg I: femur, 1-1-1 P, 1-1-1-1 D, 1-1 R; patella, 1-1 P; tibia, 1-1 P, 1 R (1/2 B), 2-1-2 V, and a strong apical spine (ventral posterior); metatarsus, 1-1 P, 1-2 V (1/2 A), strongly curved with a well-marked retrolateral elbow. Leg II: femur, 1-1-1 P, 1-1-1-1 D, 1-1-1-1 R; patella, 0; tibia, 1-1 P, 2-1-3 V; metatarsus, 1 P, 1-1 D, 1 RM, 2-2-2 V. Leg III: femur, 1-1-1 P, 1-1-1-1 D, 1-1-1 R; patella, 1-1 P, 1 R; tibia, 1-1-1 P, 1-1 D, 1-1 R, 2-2-3 V; metatarsus, 1-1-1 P, 1-1-1 D-P, 1-1-1 D-R, 2-2-3 V. Leg IV: femur, 1-1-1-1 P, 1-1-1-1 D, 1-1-1-1 R; patella, 1 R; tibia, 1-1 P, 1 DB, 1-1 R, 2-2-3 V; metatarsus, 1-1-1 P, 1-1-1 D-P, 1-0-1 D-R, 1-1-9-1 R, 2-1-1-3 V. Pedipalp: femur, 1 PA, 1-1-1 d; patella, 1 PA; tibia, 1-2-2 P, 1 D, 1 RA, developed retroventral projection (Fig. 4E); tarsus, 0. Copulatory bulb tapering, with two developed flags (center with a large spoon-like depression), with the distal portion truncate continuing with a short, slender and curved tip, with two strong posterior keels (Fig. 4A–D). ***Scopula*:** Metatarsi: I, dense, distributed throughout the segment (more abundant 1/2 A); II, dense, distributed throughout the segment; III, sparse apical, divided by setae; IV, 0. Tarsi: I—II, dense, uniformly distributed throughout the segment; III—IV, dense, uniformly distributed and divided by a wide band of setae (narrow on III). ***Trichobothria*:** Tibiae: I 11-12; II 11-10; III 10-11; IV 13-12. Metatarsi: I 1(5)1(3)1(3)1(4); II 1(5)2(4)1(2)1(5); III 1(5)1(3)1(2)1(1)1(4); IV 1(6)1(5)1(7). Tarsi: I-III 14; IV 15. ***Preening combs*:** III 3 RV-3 PV, IV 2 PV-3RV. ***Color*:** Entire body reddish-brown, first leg darker. Sternum and coxae lighter. All tarsi with ventral and laterals pallid, but not flexuous. Abdomen brown with dorsal chevrons (Fig. 3C); spinnerets with same color as abdomen.

Female (SAM-ENW-X013899, Fig. 5A–E): ***Total length*:** 17.61. ***Cephalothorax*** (Fig. 5A): length 5.15, width 3.88. Cephalic region: length 3.43, clypeus small (almost absent), with 4 marginal bristles; 12 bristles in front of the OQ, with a line of setae reaching as far as the fovea. ***Fovea*:** width 0.77, straight (slightly recurved). ***Eyes, diameters and interdistances*** (Fig. 5C): AME 0.10, ALE 0.26, PME 0.18, PLE 0.24, OQ

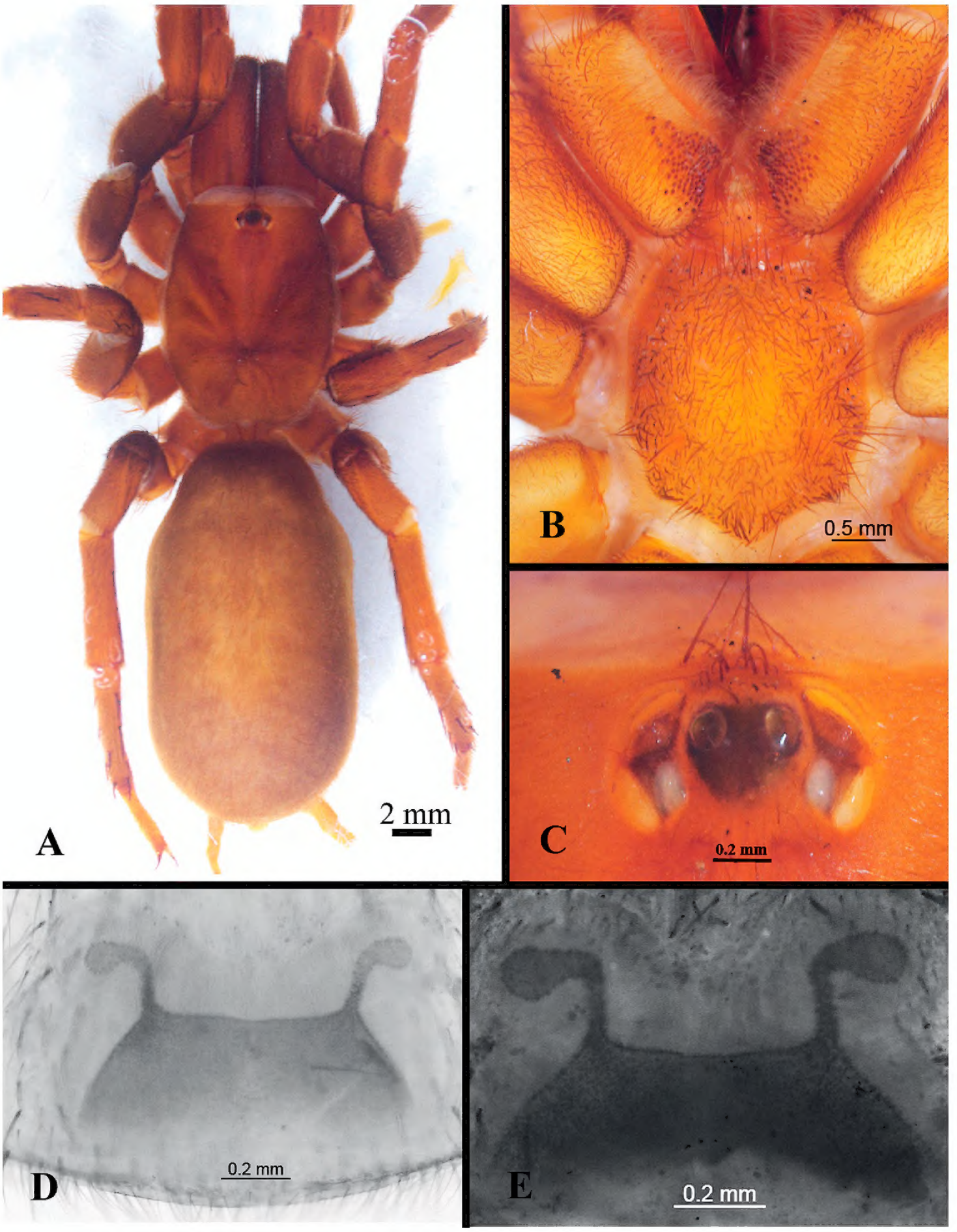

Figure 5. *Ekapa curvipes*, female (SAM-ENW-X013899) **A** overall dorsal view **B** sternum, labium, maxillae, ventral view **C** ocular pattern, dorsal view **D, E** spermathecae **D** female from Bergvliet Flats, Western Cape (SAM-ENW-X013899) **E** female from same locality (SAM-ENW-X012166).

length 0.49, width 0.89; AME-ALE 0.07, PME-PLE 0.02, AME-PME 0.11, ALE-PLE 0.05, AME-AME 0.17, PME-PME 0.42. ***Chelicerae*:** length 3.81, width 2.68; with dorsal-retrolateral dark bristles, rastellum with numerous rough bristles. Fang

groove with 9 promarginal teeth and 16 mesobasal denticles. ***Labium*:** length 0.48, width 0.94, with 2 cuspules. ***Maxillae*:** length 2.16, width 0.92, with 133 cuspules on inner corner, prolateral face slightly curved, soft area small, with long uniformly distributed hairs, no serrula. ***Sternum*** (Fig. 5B): length 2.74, maximum width 2.29. ***Abdomen*:** length 8.74, covered with small hairs and setae. PMS: length 0.68; PLS: length of basal:medial:apical segments 1.26:0.79:0.86. ***Lengths of legs and palp*:** I: 3.93, 2.45, 2.68, 2.41, 1.62, 13.71. II: 3.71, 2.24, 2.32, 2.84, 1.57, 12.68. III: 2.97, 1.79, 1.68, 2.46, 1.44, 10.34. IV: 3.39, 2.22, 3.06, 3.55, 1.54, 14.30. Palp: 2.89, 1.59, 1.69, —, 2.00, 8.17.

***Chaetotaxy*:** Leg I: femur, 1 PA; patella, 1 PA; tibia, 1-1 P, 1-1-3 V; metatarsus, 2-1-1 V. Leg II: femur, 1-1-1-1 d, 1 PA; patella, 1-1 P; tibia, 1-1 P, 1-1-2 V; metatarsus, 1-1 P (1/2 B), 2-2-2 V. Leg III: femur, 1 db, 1-1 P, 1 RA; patella, 1-1-1 P, 1 R; tibia, 1-1 P, 1-1 D, 1-1 R, 2-2-3 V; metatarsus, 1-1-1 P, 1-1-1 D-P, 1-1-1 D-R, 2-2-3 V. Leg IV: femur, 1-1-1-1 d, 1 PA; patella, 1 R; tibia, 1-1 R, 2-2-2 V; metatarsus, 1-1-1 P, 1-1 D-P (1/2 ANT), 1-1-1-1 D-R, 2-1-1-1-3 V. Pedipalp: femur, 1 PA; patella, 1-1 p; tibia, 2-1-1-3 P, 1-2-3 V; tarsus, 2 P, 1 VB. ***Spermathecae*:** complete, a high base with two lateral stalks, with an elongated receptacle (Fig. 5D, E). ***Scopula*:** Metatarsi: I, dense, uniformly distributed; II, dense, 3/4 A, divided by setae; III—IV, 0. Tarsi: I, dense, uniformly distributed; II, dense, uniformly distributed and divided by setae; III—IV, sparse, uniformly distributed (III divided by a wide band and IV by a very wide band of setae). ***Trichobothria*:** Tibiae: palp 8-9; I 9-9; II 6-5; III 8-8; IV 9-9. Metatarsi: I 1(5)1(4)1(2)1(3); II 1(4)1(3)1(1)1(3); III 1(4)1(3)1(1)1(4); IV 1(5)1(2)1(2)1(1)1(5). Tarsi: palp 10; I 14; II-III 12; IV 14. ***Preening combs*:** II 2 PV, III 3 PV, IV 3 RV-2 PV. ***Color*:** Entire body reddish-brown (chelicerae darker), legs same color as cephalothorax. Abdomen brown, with a mottled pattern dorsally; spinnerets same color as abdomen.

Distribution. Known from the Western Cape Province.

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